Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An optical network system with quality control function characterized in that in an optical network system wherein a signal to be transmitted is converted to an optical signal of a prescribed wavelength and transmitted over an optical transmission path by a transmit-end wavelength converter; and said optical signal from said optical transmission path is received and wavelength-converted by a receive-end wavelength converter, for regenerating the signal to be transmitted, the optical network system comprising:

said transmit-end wavelength converter for a transmit end with a first transponder further comprising:

an optical signal input unit for inputting an optical signal to be transmitted;

a test signal generator circuit ultimately connected to said optical signal input unit for generating a test signal for testing optical transmission quality, said test signal generator circuit further comprising:

a clock generator for generating a clock signal indicative of a bit rate to be added to the test signal;

an 'all 1s and all 0s' generator circuit for generating 'all 1s and all 0s' signals; and

a scrambler circuit connected to said 'all 1s and all 0s' generator circuit for scrambling the 'all 1s and all 0s' signals to generate the scrumbled test signal;

an insertion circuit connected to said optical signal input unit and said test

signal generator circuit for outputting an output signal by selectively inserting the test signal from said test signal generator circuit in the optical signal for the optical transmission quality in a transmission path formed between the transmit end and a receive end; and

a converter connected to said insertion circuit for converting the output signal of said insertion circuit to a predetermined optical wavelength; and

said receive-end wavelength converter at the receive end with a second transponder further comprising:

an extraction circuit for selectively extracting the test signal in the optical signal from said transmission path;

a test comparison circuit connected to said extraction circuit for determining the optical transmission quality based on the test signal extracted by said extraction circuit, said test comparison circuit further comprising:

a clock extraction circuit for extracting the clock signal from the test signal that is received at the receive end in order to synchronize with the bit rate of the selected test signal;

a descrambler circuit connected to said clock extraction circuit for using the clock component for descrambling the scrambled test signal to generate descrambled signals;

a selector circuit connected to said descrambler unit for selecting one of the descrambled signals from said descrambler circuit; and

a comparison test circuit connected to said selector circuit for performing a test signal comparison and a bit error count/computation of the selected descrambled signal.

2. (original) The optical network system with quality control function according to claim 1 wherein said test signal generator circuit further comprising a pseudo-random signal generator circuit.

3. (cancel)

4. (cancel)

5. (original) The optical network system with quality control function according to claim 1 further comprising:

a switch for initiating the test signal comparison for assessing the quality of the transmission path prior to establishing the transmission path, if the quality of the transmission path being less than a predetermined transmission path quality level, another transmission path being established, another test signal comparison being performed for the quality of said another transmission path.

6. (currently amended) An optical transponder in connection with a client line and an optical transmission line, comprising:

a first optical to electronic (O/E) converter for converting an optical signal from the client line to an electronic signal;

a signal testing unit connected to said first O/E converter for selectively adding an electronic test signal to the electronic signal so as to generate a test-signal-contained electronic signal, said ~~test~~ signal ~~generator circuit~~testing unit further comprising:

a clock generator for generating a clock signal indicative of a bit rate to be added to the test-signal-contained electronic signal;

an 'all 1s and all 0s' generator circuit for generating 'all 1s and all 0s' signals; and

a scrambler circuit connected to said 'all 1s and all 0s' generator circuit for scrambling the 'all 1s and all 0s' signals to generate the scrumbled test signal

a first electronic to optical (E/0) converter connected to said signal testing unit for converting the test-signal-contained electronic signal to generate a test-signal-contained optical signal to be transmitted in the optical transmission line;

a second optical to electronic (O/E) converter connected to said signal testing unit for converting the test-signal-contained optical signal from the optical transmission line to the test-signal-contained electronic signal, wherein said signal testing unit determines quality of transmission in the optical transmission line based upon the electronic test signal, said signal testing unit further comprising:

a clock extraction circuit for extracting the clock signal from the test-signal-contained electronic test signal in order to synchronize with the bit rate of the electronic test signal;

a descrambler circuit connected to said clock extraction circuit for using the clock component for descrambling the scrambled test signal to generate descrambled signals;

a selector circuit connected to said descrambler unit for selecting one of the descrambled signals from said descrambler circuit;

a comparison test circuit connected to said selector circuit for performing a test signal comparison and a bit error count/computation of the selected descrambled signal; and

a second electronic to optical (E/0) converter connected to said signal testing unit for converting the test-signal-contained electronic signal to generate the optical signal to the client line.

7. (original) The optical transponder according to claim 6 wherein said signal testing unit further includes a random signal generation unit for generating a random signal as the electronic test signal.

8. (original) The optical transponder according to claim 6 wherein said signal testing unit further includes a predetermined signal generation unit for generating a predetermined sequence of 0 and 1 signals.

9. (cancel)

10. (cancel)

11. (cancel)

12. (original) The optical transponder according to claim 6 wherein said signal testing unit further includes an error count unit for counting a number of errors or bit errors based upon the electronic test signal.

13. (canceled)

14. (original) The optical transponder according to claim 6 wherein said first O/E converter and said second O/E converter each convert from the optical signal at a predetermined single wavelength, said first E/O converter and said second E/O converter each converting to the optical signal at the predetermined single wavelength.

15. (previously presented) The optical transponder according to claim 6 wherein said first O/E converter converts from a predetermined wavelength optical signal to an electronic signal and said second O/E converter converts from an optical signal with different wavelengths to an electronic signal, said first E/O converter converts from an electronic signal to the optical signal with different wavelengths and said second E/O converter converts from an electronic signal to a predetermined wavelength optical signal.

16. (currently amended) An optical signal network in connection with client lines and an optical network transmission line, a plurality of nodes each connected to a corresponding one of the client lines and the optical network transmission line, the client lines each having an optical signal at a predetermined optical wavelength, the optical network transmission line having an optical signal at a plurality of multiplexed wavelengths, each of said nodes comprising:

an optical wavelength separator connected to the optical network transmission line for separating the optical signal at a desired wavelength;

an optical wavelength combiner connected to the client lines and the optical network transmission line for combining the optical signals at the multiplexed wavelengths; and

a transponder connected to said optical wavelength separator and said optical wavelength combiner for converting the optical signal at a first wavelength to a second wavelength, said transponder further comprising a set of optical-to-electronic converters, electronic-to-optical converters and a transmission quality testing unit connected between said optical-to-electronic converter and said electronic-to-optical converter for testing a transmission quality of the optical network transmission line, said transmission quality testing unit further comprising;

a test signal generator circuit for generating a test signal for testing optical network transmission line quality~~;~~, said test signal generator further comprising:

a clock generator connected to said test signal generator circuit for generating a clock signal indicative of a bit rate to be added to the test signal from said test signal generator circuit;

an 'all 1s and all 0s' generator circuit for generating 'all 1s and 0s' signals;

a scrambler circuit connected to said 'all 1s and all 0s'generator circuit for scrambling the 'all 1s and all 0s' signals to generate the scrumbled test signal;

a test comparison circuit for determining the optical network transmission line quality based on the test signal received from other nodes~~; and~~, said test comparison circuit further comprising:

a clock extraction circuit for extracting the clock signal from the separated test signal in order to synchronize the bit rate of the separated test signal.

a descrambler circuit connected to said clock extraction circuit for using the clock component for descrambling the scrambled test signal to generate descrambled signals;

a selector circuit connected to said descrambler unit for selecting one of

a test signal comparison and a bit error count/computation of the selected descrambled signal.

17. (original) The optical signal network according to claim 16 wherein said optical wavelength separator is an optical demultiplexor.

18. (original) The optical signal network according to claim 16 wherein said optical wavelength combiner is an optical multiplexer.

19. (previously presented) The optical signal network according to claim 16 further comprising an optical switch matrix located between said optical wavelength separator and said optical wavelength combiner.

20. (previously presented) The optical signal network according to claim 16 further comprising a monitor control unit connected to said transmission quality testing unit for monitoring and controlling said transmission quality testing unit.

21. (cancel)

22. (cancel)

23. (original) The optical signal network according to claim 16 wherein said optical wavelength separator is an optical wavelength add/drop module.

24. (original) The optical signal network according to claim 16 wherein said optical wavelength combiner is an optical wavelength add/drop module.

25. (original) The optical signal network according to claim 16 wherein a plurality of said transponders receives the optical signal from said optical wavelength separator at any combination of the desired wavelengths.

26. (original) The optical signal network according to claim 16 wherein a plurality of said transponders receives the optical signal from the client lines at any combination of the desired wavelengths to output to said optical wavelength combiner.

27. (currently amended) A method of testing transmission quality in an optical network having optical transmission lines and client lines connected to the optical transmission lines, comprising:

converting an optical signal at a first wavelength from one of the client lines to a electrical signal in a transponder;

generating a test signal for testing optical transmission line quality;

specifying a bit rate of the test signal by adding a clock signal to the test signal;

adding the electrical signal to the test signal in the transponder;

scrambling the electrical signal to generate the scrambled test signal;

converting the electrical signal to the optical signal at a second wavelength in the transponder to be transmitted in the optical transmission lines;

converting the optical signal at the second wavelength from the optical transmission lines to the electrical signal in the transponder;

extracting the clock signal from the test signal;

descrambling the scrambled test signal based upon the extracted clock signal to generate descrambled signals;

selecting one of the descrambled signals;

performing a test signal comparison and a bit error count/computation of the selected descrambled signal;

synchronizing the bit rate of the test signal based upon the clock signal;

determining transmission quality based upon the test signal in the transponder; and

converting the electrical signal to the optical signal at the first wavelength in the transponder to be outputted to the one of the client lines.

28. (original) The method of testing transmission quality in an optical network according to claim 27 further comprising selecting the client lines based upon the transmission quality.

29. (original) The method of testing transmission quality in an optical network according to claim 27 further comprising selecting the optical transmission lines based upon the transmission quality.

30. (original) The method of testing transmission quality in an optical network according to claim 27 further comprising multiplexing the optical signal at a plurality of wavelengths, wherein said transmission quality is determined for each of the wavelengths of the optical signal.

31. (previously presented) The method of testing transmission quality in an optical network according to claim 27 further comprising demultiplexing the optical signal received from the optical transmission lines to optical signals at a plurality of wavelengths including the first wavelength; and

selecting at least a part of the wavelengths that includes the first wavelength among the plurality of the demultiplexed optical signals in order to determine transmission quality.

32. (currently amended) The method of testing transmission quality in an optical network according to claim 31 wherein the wavelengths of the selected demultiplexed optical signals are remotely selected for determining the transmission quality.